

cells," which result from the amœboid degeneration of the collared cells. These he traces to the ectoderm, and he suggests that they are excretory in function.

Secondly, he finds that the ectodermal gland-cells (for which he claims a general occurrence in sponges) are excretory in function, and conduct a process of intracellular excretion. I can find, however, no evidence in his paper of the occurrence of diapedic nephrocytes, which are so clear a feature in the form I studied, unless, indeed, his Metschnikoff cells be shown later to leave the colony through the ectoderm.

The course of the metabolic circuit through the tissues, including the identification of the endodermal choanocytes and the so-called "mesoderm," both morphologically and physiologically, and the part played by each in ingestion and digestion, are all points in which Mr. Bidder's conclusions, arrived at independently and prior to my own, agree with the latter, and confirm the doubts which I expressed with regard to Lendenfeld's deductions.

The importance of the collar-cell metamorphosis from a phylogenetic point of view may be expressed in the statement that further proof than at present exists must be forthcoming before the presence of a true mesoderm or middle germinal layer in the sponges can be accepted as an established fact.

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### XIII.—*A Visit to Damma Island, East Indian Archipelago.*

By JAMES WALKER.—*With Notes on the Fauna*, by R. B. SHARPE, G. A. BOULENGER, E. A. SMITH, R. I. POCKOCK, C. O. WATERHOUSE, C. G. GAHAN, W. F. KIRBY, and F. A. HERON.

THE volcanic island of Damma, one of the northernmost outliers of the Serwatty Group, is situated almost exactly halfway between the large islands of Timor and Timor-Laut, and about 350 miles from the nearest point of the coast of Australia. It is less than ten miles in length by about five miles wide, and thus ranks among the smaller members of the great Eastern Archipelago, while it is certainly one of the most remote and least known of them all. Though the island has been for some time in the possession of the Dutch, nothing was known of its natural history previous to the visit of H.M. surveying-ship 'Penguin,' so far as I can ascertain, except that a Dutch collector had landed there for a short time and had procured a few birds. It was the cause of no little satisfaction, both to myself and to my energetic fellow-worker, Dr. P. W. Bassett-Smith, that orders were received

on board the 'Penguin' to call at Damma on the voyage from Port Darwin to Hong Kong, and to survey the principal anchorage, Koelewatte Bay—a service which would occupy several days in its execution, and afforded us a prospect of work on a spot hitherto almost untouched by a naturalist.

The 'Penguin' sailed from Port Darwin on October 28th, 1891, and a few days were occupied in the survey of the "Flinders Bank" and other shoals on the edge of the region of comparatively shallow soundings which extends for a long distance from this part of the north coast of Australia. This work being completed on November 4th, we shaped our course for Damma, which was sighted at sunset on the following day. This island rises abruptly from profoundly deep water, a depth of several hundred fathoms being found in the entrance of Koelewatte Bay itself; and at a distance of about forty miles to the southward we reached bottom at 2637 fathoms. Although at first sight Koelewatte Bay has the appearance of a commodious harbour, the available space for anchorage is very limited, the upper part being greatly encumbered with sand-banks and coral-reefs, while it is fully open to the easterly monsoon, which sends in a heavy sea. At the time of our visit the weather was very fine and calm, and we lay snugly enough in twenty fathoms water close to the shore, opposite the crumbling remains of what had once been a very strongly built stone watch-tower, of unknown origin and antiquity.

Soon after we anchored, at 6.30 A.M. on November 6th, the "Posthonder," or representative of the Netherlands Government, came off to the ship in a dug-out canoe to pay his official visit. He was a tall, grey-bearded old man, a Macassar half-caste, and was dressed in the orthodox but most uncomfortable black cloth coat which is *de rigueur* on all occasions of ceremony throughout the Dutch possessions in this part of the world. His staff of office was a gold-headed cane surmounted by the Royal arms of Holland. No European lives here permanently, but the Resident of Amboyna, under whose rule Damma is placed, visits the island annually in a man-of-war, and the mail steamer which makes the round of the Aru, Kei, and other remote islands of the Far East, calls here once in three months for a few hours. This is the sole communication of Damma with the outside world.

We remained at anchor in Koelewatte Bay until the evening of November 11th, and during our stay the harbour was surveyed, a full series of observations to determine the magnetic elements was made, and the Doctor and I were able

to ramble about on shore to our heart's content. After the monotony of the wretchedly sterile and featureless coasts of North-west Australia, where we had spent the previous six months, the aspect of this little island was most picturesque and pleasing. The Bay is enclosed on either hand by hills of remarkable steepness and bold serrated outline, rising abruptly from the water's edge to a height of from 600 to 2000 feet; while from high-water mark (and even from below this, if the dense growth of mangrove which fringes the shore in many parts is taken into account) these hills are clothed with a dense unbroken forest of the most vivid green, but apparently not consisting of very large trees. On the northern side of the Bay the fine volcanic peak rises to a height of more than 4000 feet, emitting a constant stream of white smoke from a large depression near its somewhat truncated summit. The upper half of the mountain is bare of forest growth, and is seamed with huge rents and landslips, while bright yellow patches of sulphur can be readily made out near the top. Small quantities of this substance, in a finely crystallized state, are occasionally brought down for export by the natives. Even they do not appear to ascend the mountain very often, and during the stay of the 'Penguin' none of our people mustered up sufficient energy to attempt to reach the summit. The ascent is represented by the inhabitants as being very laborious, and not to be accomplished in a single day. From the steepness and rugged nature of the slopes of the mountain, and the dense and tangled nature of the almost trackless forest which clothed its lower half, I can readily imagine that this is the case. The volcano appears to have remained in its present quiescent state for many years past.

We found it a matter of no small difficulty to penetrate for any distance into the forest, as there were scarcely any paths except in the immediate neighbourhood of the villages, and prickly rattans and thorny bushes rendered the dense undergrowth almost impassable. The shores of the Bay afford somewhat easier walking, and on its north side, at the junction of the sandy beach with the rocks just above high-water mark, are innumerable little springs and trickles of perfectly fresh and pure, but almost boiling water. Some of the larger springs are even utilized by the natives to cook their food, and in none of them can the hand be held even for an instant. In several places, indeed, the volume of hot water flowing over the sand is so great that it is by no means pleasant to walk over, even in thick boots. A beautiful clear stream falls into the head of the Bay, and flows down a

picturesque gorge, shaded with fine trees, giving access for nearly a mile into the interior of the island, beyond which its rugged and rocky bed, encumbered with huge blocks of trachyte, becomes quite impassable on foot.

Damma is rather scantily inhabited by two races of Papuan and Malay type, who live in separate villages scattered round the shore of the island, and appear scarcely, if at all, to intermix with each other. As Dr. Bassett-Smith has given elsewhere a detailed account of the inhabitants of Damma (Trans. Anthropological Institute, Nov. 1893, p. 135 *et seq.*), it is not necessary for me to say much about them here. Solla, one of the principal Malay villages, is situated near the head of Koelewatte Bay and consists of about thirty very neat palm-leaf huts, surrounded by a well-made "dry-stone" wall some eight feet in height, access being obtained to the interior by means of wooden ladders. The land close to this village, and about the mouth of the stream, is fairly level, and is partly cleared, and roughly planted with tobacco, bananas, a poor kind of bread-fruit tree, the jack-fruit (*Artocarpus integrifolia*), the rose-apple (*Eugenia Jambos*), and the mango. The last-mentioned tree attains to a great size, and produces abundance of delicious fruit, which was just beginning to ripen at the time of our visit. The coco-nut palm flourishes everywhere near the sea, and is tapped for "sagueir" or palm-wine, which is a slightly effervescent milky-looking fluid, somewhat like rather "hard" cider, with a slight but pleasant flavour of the coco-nut, and is very refreshing to drink in the heat of the day. The sago-palm also grows profusely in swampy places, and furnishes the principal sustenance of the natives; the process of preparing the sago from the pith of the palm, in the curious washing-troughs made from the tree itself (so admirably described by Dr. Wallace in the 'Malay Archipelago'), was to be seen in full swing on the bank of the stream. Some fine and curious beetles were obtained by turning over the heaps of half-fermented fibrous refuse resulting from this operation.

The natives have a few pigs and fowls, and are expert fishermen, using a cast-net in the shallows for small fish, and shooting larger ones in the water with a peculiar arrow having three barbed prongs of hard wood. Their canoes are of exceedingly elegant shape and very creditable workmanship, and are hewn out, thwarts and all, from solid logs of a large leguminous tree, which furnishes a soft white timber very like the wood of the lime-tree. The tools used in the work are small adzes, axes, and chisels, the finishing touches being given by a "parang," or chopping-knife. Stability is

imparted to these long narrow boats by means of outriggers about ten feet distant from either side, and they are practically unsinkable.

We found these people, without exception, very friendly and well-disposed; the women and young girls were somewhat shy at first, but the small boys were inquisitive, as they are in most other places. In my rambles I was usually accompanied by three or four little urchins, with clothing reduced to a minimum, and they proved very useful in hunting up insects, land-shells, &c. for me. One beetle, a large bronze-coloured Buprestid (*Belionota Walkeri*, Waterhouse), was very abundant on felled timber, but was so exceedingly shy and active on the wing as to defy my efforts for a long time to secure one with a big net. The boys caught them with their hands without the least trouble, exactly as a schoolboy at home catches a "bluebottle," and in a very little while they brought me as many specimens as I wanted. On another occasion I was much amused at the manner in which a little Papuan boy secured the large freshwater prawns (*Palaemon*, sp.) which abounded in the deeper pools in the bed of the stream. He took two long fibres from the pinnule of a rattan-palm, one of which he formed into a running noose, while a morsel of bait was attached to the end of the other. On presenting this bait to a prawn, the creature at once laid hold of it with its long chelæ with an action ludicrously like that of a monkey, and, while thus busily engaged, the noose was gently slipped over its tail and the Crustacean flicked on to *terra firma* with a smart jerk. The boy caught prawn after prawn in much less time than it takes me to describe the operation; but neither my companions nor I could secure a single specimen in this way, though we spent more than half an hour in trying to do so.

A brisk trade was carried on with the natives for weapons, such as heavy palm-wood bows, bamboo-arrows, and spears with large lancet-shaped heads of soft iron &c., besides such personal ornaments as long bamboo combs and neatly carved bone and tortoiseshell earrings and armlets. Old clothes and silver coins were readily taken in exchange for these, the latter being much appreciated for working up into ornaments; but the number rather than the value of the coins appeared to be taken into account when bartering, as a good deal more could be obtained for four threepenny pieces than for a shilling. Tobacco was also eagerly accepted.

In the forest the most abundant birds were two very handsome large fruit-pigeons (*Carpophaga concinna*, Wall., and *C. rosacea*, Temm.). The deep booming notes of these birds

could be heard everywhere, especially in the early morning and towards sunset, though in the thick jungle they were by no means easy to see. The crop of nearly every specimen shot was found to contain one or more entire nutmegs, evidently from wild trees, as the nutmeg is not cultivated on Damma. These imparted a peculiarly delicate flavour to the flesh of the pigeons, which were consequently the objects of eager pursuit by our sportsmen. A very beautiful little green fruit-dove (*Ptilopus xanthogaster*) was not rarely seen, and flocks of small and very noisy green parrots frequented the tops of the tall mango-trees, quite out of gunshot. I did not meet with any white cockatoos, which are said to be found on the island.

Butterflies were tolerably numerous, especially along the course of the stream; but I was unfortunately not able to secure examples of the three finest species seen. These were a large light-coloured *Charaxes* and two handsome *Papilios*—one a large black-and-white species evidently allied to the Australian *P. erechtheus*, the other being, I feel almost sure, the *P. aberrans*, Butl., recorded from Timor-Laut. Some twenty-five species in all were observed, the most noteworthy being two or three forms of *Euplœa*, a red *Danaïs* (*Salatura laratensis*, Butl.), a very pretty *Neptis*, a *Precis* (probably *P. timorensis*, Wall.), two or three species of *Terias*, and several Lycænidae. Nearly all these appear to be closely allied to or identical with the species collected by Mr. H. O. Forbes in Timor-Laut, and described by Mr. Butler (P. Z. S. 1883, pp. 366, 367). Not the least interesting capture was a large light-coloured female specimen of that wandering butterfly *Anosia plexippus*, L., which I shortly afterwards met with abundantly in the islands of Amboyna and Ternate, many thousands of miles away from its original American home.

The Coleoptera were also well represented both in species and individuals, and I found two recently made clearings in which the stumps and such felled trees as had been allowed to remain yielded a good harvest of small but very interesting beetles under the loose bark and among decaying leaves and fungi. Two grand Buprestidæ, *Cyphogastra abdominalis* and *Pseudochrysodema Walkeri*, recently described by Mr. C. O. Waterhouse (Ann. & Mag. Nat. Hist. ser. 6, vol. x. pp. 410–412), were not rare here, flying in the bright morning sunshine and settling on logs and stumps. These beetles appeared to take a great fancy to one particular stump of a large *Ficus* tree near the top of a steep bank, and not easily reached; but, unlike another large Buprestid already

alluded to, they were sluggish and heavy in flight, and were not very difficult to catch. The bright yellow dorsum of the *Cyphogastra* is very conspicuous when the insect is on the wing. One of the most interesting beetles met with was a singular form of the Heteromorous genus *Platydemia* (*asymmetricum*, Champion, Ent. Month. Mag. ser. 2, vol. iv. p. 274), the male of which is furnished with a single long erect horn on the left side of the head. The Longicornes proved, to my disappointment, to be very poorly represented here, as only two or three species of this important group of beetles were captured.

Other insects were fairly abundant, and I must not forget to mention the mosquitoes, which were sufficiently numerous and troublesome in the vicinity of water; nor the ants, which swarmed everywhere, and on one occasion got into my pith helmet (used as a collecting-box) in myriads while I was resting and dozing under a tree, and ate up my entire day's catch of butterflies. Fortunately the solitary specimen of *Anosia plexippus*, which I valued more than any other, was evidently not to their taste, as it escaped their devouring jaws without the slightest damage. On the prickly leaves of the *Pandanus*, or screw-pine, growing on the beach, a large green "stick-insect" was frequently met with in pairs, and was remarkable for emitting when handled a milky-looking fluid, having a strong odour of peppermint, from the thoracic spiracles.

I could only hear of one mammal indigenous to Damma, this being a species of *Uscus*, or eastern opossum (*C. maculatus*). One of the men procured a young specimen from the natives, which, on its decease two or three days afterwards, was handed over to me and duly put into spirit.

The result of our five days' collecting was approximately as follows:—

- 1 species of Mammalia.
- 9 species of Birds (skinned and preserved by Dr. Bassett-Smith).
- 5 species of Reptiles.
- 7 species of Land and 3 species of Freshwater Mollusca.
- 100 species of Coleoptera.
- 30 species of Lepidoptera.
- 30 species of other orders of Insects.
- 1 Freshwater Crustacean.

As well as a large number of specimens of marine zoology, collected by the doctor on the reefs and by dredging in the harbour.

We finally quitted Damma on the afternoon of November 11th, enjoying a splendid view of the volcano as we steamed slowly out of Koelewatte Bay; and I think that all on board regretted that our stay at this interesting little island was necessarily so brief, even though our next halting-place was to be one of the most beautiful and famous localities in the Eastern tropics—the island of Amboyna.

Zoological collections of great scientific interest were made during the surveying-voyages of H.M.S. 'Penguin,' under the command of Captain W. U. Moore, by Messrs. J. J. Walker, Chief-Engineer, and P. W. Bassett-Smith, Surgeon of the ship. All these collections were presented by the Lords of the Admiralty to the Trustees of the British Museum, and are in progress of being worked out by the staff of the Zoological Department. The following notes refer to the terrestrial fauna only of the island.—A. G.

### BIRDS. By R. B. SHARPE.

The small collection of birds obtained on Damma Island apparently contains two species new to science. One of these, *Rhipidura Büttikoferi*, I have already described; and in the present paper I add another species to the overwhelming genus *Zosterops*.

So far as can be judged from this small amount of material, the birds of Damma Island are almost identical with those of Timor-Laut on the one hand and Timor on the other, though some species, such as *Rhipidura elegantula*, may be found peculiar to the Damma, Lettie, and Wetter group of islands.

#### 1. *Rhipidura elegantula*.

*Rhipidura elegantula*, Sharpe, Notes Leyden Mus. i. p. 23 (1879).

An adult specimen in rather poor condition. I think, however, that there can be no doubt about the identity of the bird with *R. elegantula*, which I described from a Lettie specimen in the Leyden Museum.

#### 2. *Rhipidura Büttikoferi*.

*Rhipidura Büttikoferi*, Sharpe, Bull. Brit. Orn. Club, no. iv. p. xviii (1892).

An adult bird. This species is closely allied to *Rhipidura setosa*, but is much darker brown above, being blackish brown, not grey, and having much more white on the two outer tail-feathers. Total length 6·8 inches, wing 3·4.



3. *Graucalus melanops*.

*Graucalus melanops* (Lath.), Sharpe, Cat. B. iv. p. 30 (1879); Salvad. Orn. Papuasia, ii. p. 130 (1881).

One adult and two immature birds. This species has somewhat a wide range in the Moluccas, being found not only in Australia, but in New Guinea, the Aru and Kei Islands, Amboina, and Timor.

4. *Zosterops Bassetti*, sp. n.

Similis *Z. albiventri*, sed paullo major, loris et gutture aurantiacis nec sulphureis, et corporis lateribus cinerascenti-brunneis nec isabellinis distinguenda.

Long. tot. 5·0 poll., culm. 0·6, alæ 2·45, caudæ 1·75, tarsi 0·75.

This species belongs to the section of the genus *Zosterops* which contains *Z. albiventer* and *Z. crissalis*. It is very like both these species, but is slightly larger than either of them. The loreal spot and the throat are of a deeper and more orange-yellow, and the sides of the body are ashy brown, darker than the same parts in *Z. albiventer*, but not so dark as in *Z. crissalis*.

5. *Stigmatops kebirensis*.

*Stigmatops kebirensis* (A. B. Meyer), Salvad. Agg. Orn. Papuasia, ii. p. 123 (1890).

A single specimen, which seems to be immature. The scaling on the throat appears not to extend down the breast as in *S. squamata*, but to be more confined to the throat, this being one of the characters of *S. kebirensis*.

On looking over the series of these birds in the Museum, I must say that I fail to see the characters for separating *S. Salvadorii* of Timor-Laut from the true *S. squamata* from Koor, of which two specimens are in the Museum. It also seems to me very doubtful if the distinctness of *S. kebirensis* will ultimately be maintainable, for it appears quite probable that the characters of this species are those of immaturity.

It should be noticed that, according to Count Salvadori, *Stigmatops chloris* is found on Damma; but the specimen now sent is certainly not of that species.

6. *Hirundo gutturalis*.

*Hirundo gutturalis* (Scop.), Salvad. Orn. Papuasia, ii. p. 1 (1881) Sharpe, Cat. B. x. p. 134 (1885).

A young bird just commencing its moult.

7. *Psitteuteles euteles*.

*Psitteuteles euteles* (Temm.), *Salvad. Cat. B.* xx. p. 64 (1891).

An adult male. Apparently a species confined to the Timor group of islands, and already known from Timor, Flores, Wetter, Lettie, Babbar, and Timor-Laut.

8. *Ptilopus xanthogaster*.

*Ptilopus xanthogaster* (Wagl.), *Salvad. Orn. Papuasias*, iii. pp. 4, 554 (1882); *id. Cat. B.* xxi. p. 91 (1893).

An adult bird. This species has already been recorded from Lettie, and it is also found in Banda, Timor-Laut, and the Kei Islands.

9. *Carpophaga rosacea*.

*Carpophaga rosacea* (Temm.), *Salvad. Orn. Papuasias*, iii. p. 89 (1882) *id. Cat. B.* xxi. p. 198 (1893).

An adult male. Found in all the Timor group of islands, and already recorded from Lettie, Kisser, and Wetter; also occurs in the Kei Islands, Halmahéra, and Celebes.

10. *Carpophaga concinna*.

*Carpophaga concinna*, Wall., *Salvad. Orn. Papuasias*, iii. p. 81 (1882); *id. Cat. B.* xxi. p. 186 (1893).

An adult male. This specimen has been recorded by Count Salvadori in the 'Catalogue.' The species is found in Timor-Laut and Banda, as well as in Matabello, the Kei, Aru, and Sanghir groups.

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**REPTILES.** By G. A. BOULENGER.

Of the five forms obtained, three are well known and widely distributed, whilst two (*Lygosoma striolatum* and *Ablepharus Boutonii*, var. *furcata*) are recent additions to science, and were previously unrepresented in the British Museum. They have been described by Prof. Max Weber in his 'Zoologische Ergebnisse einer Reise in Niederl. Ost-Indien,' 1890, from specimens obtained on the Island of Flores.

*Gecko verticillatus*, Laur.

Widely distributed species, ranging from Bengal, Burma, and Southern China to the Moluccas and Tenimber Islands.

*Culotes cristatellus*, Kuhl.

The range of this lizard extends from the Malay Peninsula to the Moluccas and Tenimber Islands.

*Lygosoma striolatum*, M. Weber.

Two specimens were obtained by Mr. Walker: one has 40 scales round the body, like the type from Flores, the other 42. In the specimen with 40 series of scales the præfrontals are fused, the median suture having entirely disappeared. In both the first supraocular is considerably longer than the second.

*Lygosoma fuscum*, D. & B.

So far as we know at present, Damma Island is on the western limit of the distribution of this lizard, which inhabits the Moluccas, New Guinea, and Northern Queensland.

*Ablepharus Boutonii*, var. *furcata*, M. Weber.

Three specimens of this well-marked variety: two with 24 scales round the body, the third with 26; all three with four upper labials anterior to the subocular and the characteristic coloration so well described by Prof. Weber; the stripes, however, instead of being white, are golden. Total length 77 millim.

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**LAND AND FRESHWATER SHELLS.**

By EDGAR A. SMITH.

The collection of land and freshwater shells, although small, has a special interest, being the first which has been received from Damma Island. It consists of seven species of land-shells (one operculate and six non-operculate), a *Neritina*, a *Septaria*, and a *Cassidula*. Four of the non-operculate terrestrial species are certainly new, and belong to the genera *Macrochlamys*, *Xesta*, *Chloritis*, and *Eulota*. The species belonging to these groups are, generally speaking, restricted in their distribution, although the genera themselves may have a fairly wider range. On the contrary, the sixth non-operculate species belongs to the genus *Opeas*, the species of which, in some cases at least, are almost cosmopolitan. The operculate form, *Leptopoma vitreum*, is also very widely distributed.